

THE AFFINITIES OF *IDIOHAMITES* *ELLIPTICOIDES* SPATH (CRETACEOUS AMMONOIDEA)

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ABSTRACT. *Idiohamites ellipticoides* Spath is an aberrant species of the genus *Idiohamites* which shows the recoiling trend so widespread in Cretaceous heteromorph ammonites. Its ornament is identical with some members of the largely southern hemisphere family Labeceratidae, but study of suture lines show this to be merely a case of homeomorphy.

The species is described and illustrated on the basis of large new collections.

THE species *Idiohamites ellipticoides* was described by L. F. Spath in 1939 on the basis of six fragments from the Upper Albian *Mortoniceras inflatum* Zone, *Hysterocheras varicosum* Sub-zone, Gault Clay of Kent. Since that time the species has received no notice from other workers and remains poorly known. In 1964 I collected a series of specimens from the *varicosum* Sub-zone clays exposed at the Associated Portland Cement Manufacturer's clay pit at Paddlesworth, Kent, and have subsequently seen many other specimens from this locality. The new material proved to be strikingly similar to some members of the heteromorph family Labeceratidae, best known from the southern hemisphere. Because of a lack of comparative material I was unable to confirm this suspicion, but large collections of Albian labeceratids made in South Africa during 1970 and new material from Australia now show that *Idiohamites ellipticoides* is, in fact, a labeceratid homeomorph.

The species is therefore redescribed and discussed below, on the basis of Spath's types and the new material.

SYSTEMATIC DESCRIPTION

Idiohamites ellipticoides Spath

Plate 74, figs. 1–10, Pl. 75, figs. 1–6, 9, 11, ?7a–c, ?10a–c

1939 *Idiohamites ellipticoides* Spath, p. 594, text-fig. 213, pl. 65, fig. 9.

Holotype. BMNH C39746 from the Gault Clay of Folkestone, Kent.

Other material. Several specimens from Folkestone and Merstham, Kent, mentioned by Spath (1939, p. 594), scores of specimens from the *Hysterocheras varicosum* Sub-zone Gault Clay, Associated Portland Cement Co. clay pit, Paddlesworth, near Snodland, Kent (National Grid Reference 51/690620) in the collections of M. K. Durkin and J. D. Hollis. A series of specimens is deposited in the British Museum (BMNH C76840–C76857).

Description. The coiling is rather tight for *Idiohamites*, the early whorls forming a loose planispiral. The body chamber appears to have been straightened, but not, so far as is known, recurved into a crozier. The whorl section is compressed (whorl breadth: whorl height varies from 0.54 to 0.44) with rounded venter and dorsum, and flattened sides.

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Ornament consists of primary ribs which arise at the base of the flanks, and branch at a point above mid-flank. At the same point, additional, shorter intercalated ribs may be inserted. The ribs are continuous across the venter; the dorsum is smooth.

The strength, nature, degree of flexion, point and number of branches of the ribs is highly variable. I have tried to illustrate variation in Plate 74; figures 1a-c to 5a-d show variation in ornament at comparable sizes. Figures 6a-d to 10a-d show changes in ornament through ontogeny. These should be compared with the holotype (figured on Plate 75 as figures 2a-b) and a series of larger specimens figured on the same Plate (figures 3a-c, 4a-d, 5a-d).

Normally there are from five to six primary ribs in a distance equal to the whorl height. When branching is obvious, it is normally into two (i.e. Plate 74, fig. 8), but sometimes into three (i.e. Plate 74, fig. 6). Addition of intercalated ribs in these forms (i.e. Plate 74, fig. 6) is irregular, and results in their being 2 to 2.5 times as many secondary+intercalated ribs as primaries. It is of course difficult to draw a line between intercalated short ribs and branched primaries; the two grade into each other in a single specimen and between specimens (Plate 74, figs. 1, 2, 6).

A further variation in ornament is seen in some of the more compressed forms, where fine striae appear between ribs; these seem to be little more than strengthened growth lines. The species thus, to a degree, follows Buckman's first law of covariance.

Tracing changes with ontogeny (Plate 74, figs. 6a-d to 10a-d) again reveals much variation. At the smallest diameters studied (whorl height = 1.5 mm; Plate 75, fig. 2a-b), the shell is almost smooth. With growth, ribs appear, as variable in their development as on larger specimens. The largest specimens available (Plate 74, fig. 6a-d; Plate 75, figs. 4a-d, 5a-d) show an increase in the number of secondary and intercalated ribs, and frequent incipient triplication.

The holotype of *Idiohamites ellipticoides* is quite without the ventral tubercles so typical of *Idiohamites*, as are most other specimens. One individual which does have such tubercles is shown as Plate 74, fig. 9a-c; its ornament is atypical in some other respects, and it may belong to another species.

The suture-line of *I. ellipticoides* is rather simple (perhaps in part a reflection of small-size) and little subdivided (text-figure 1, figs. 1, 2a-d, 4). The saddles are small, and the lobes are distinctly bifid. In these respects there is agreement with other *Idiohamites* at a comparable size (i.e. Spath 1939, text-figures 206, 209, 210).

Discussion. Had this material been available to Spath in 1939 he would undoubtedly have divided it into a series of varieties, or even species. The presence of intermediate morphologies between the more extreme variants, as shown in the Plates, suggests a single population to me, especially in view of the widespread recognition of comparable variation in other Cretaceous ammonite groups (Reeside and Cobban 1960, Kennedy and Hancock 1970, Wiedmann 1969, for example), and the known highly variable nature of heteromorph species (Wiedmann and Dieni 1968, with discussion).

The style of ribbing, whorl section, and coiling of *Idiohamites ellipticoides* distinguishes it from all other Gault Clay *Idiohamites* and *Hamites* species, and the dubious '*Hamitoides*' *rusticus* Spath. It thus stands unique amongst described Gault heteromorphs.

CONCLUSIONS

Because of its peculiar ornament *Idiohamites ellipticoides* presents problems of affinity and particularly so as it has been referred to the Laberatidae (Owen 1970). There are in fact three groups to which the species shows resemblance, the Laberceratidae, and the genera *Algerites* and *Idiohamites*.

The Laberceratidae are a family known exclusively from the southern hemisphere, save for *Hamitoides*, whose true affinities are in fact dubious (Spath 1939, Wright 1957). Three genera are definitely placed in the family: *Labeceras*, *Myloceras*, and *Ellipsoceras*. They all show an initial open spiral, parts of which may in fact touch, and some have a hooked body chamber, often lappeted. The ornament is highly distinctive, with striking branched ribs. In this respect they find an exact match in *I. ellipticoides*; *L. (Labeceras)* is the most similar genus, as can be seen from species figured by Whitehouse (1926), Spath (1925), and Collignon (1932, 1950, 1963). Plate 75, fig. 8a-b shows a typical South African *Labeceras* for comparison.

When the suture-lines of labceratids are compared with those of *I. ellipticoides*, striking differences are apparent. The suture of *I. ellipticoides* has bifid lobes and narrow saddles; all labceratids have trifid lobes and broad saddles, as can be seen from Text-figure 1. These differences are apparent even in early stages, as is clear from a series of juvenile labceratids in the British Museum (BMNH C76781-76782, C76797).

Algerites (Pervinquière 1910) is a Cenomanian form, known only from Algeria. Its coiling is reminiscent of *I. ellipticoides* in some respects, but later whorls come to touch completely. In *Algerites* the suture-line is closely comparable to that of *I. ellipticoides*, and indeed other *Idiohamites*. Ornament links it to *Idiohamites*—close-spaced tuberculate ribs, which thus differ markedly from *I. ellipticoides*.

The coiling and suture-line of *I. ellipticoides* can be closely matched with *Idiohamites* species; in particular there is a close resemblance to *I. incertus* Spath. The ornament of *Idiohamites* is usually quite distinctive, however, with simple tuberculate ribs.

Conclusions about the affinity of *Idiohamites ellipticoides* thus rest on three criteria: ornament, coiling, and suture-line.

Branched ribbing occurs widely in Gault heteromorphs: *Hamites* shows branched ribs not uncommonly on curved parts of the shell, and some specimens of '*Hamitoides*'

EXPLANATION OF PLATE 74

Figs. 1a-c to 10a-d. *Idiohamites ellipticoides* Spath from the *Hystero-ceras varicosum* Sub-zone Gault Clay, Paddlesworth, Kent. BMNH C76848 to C76857. Specimens are figured natural size and $\times 2$.

EXPLANATION OF PLATE 75

Figs. 1a-d, 4a-d to 6a-c, 9a-d, 11a-d, ?7a-c, ?10a-c. *Idiohamites ellipticoides* Spath, from the *Hystero-ceras varicosum* Sub-zone Gault Clay, Paddlesworth, Kent. BMNH C76840 to C76847.

Fig. 2a-b. The holotype of *I. ellipticoides*, BMNH C39746, from the *H. varicosum* Sub-zone Gault Clay, Folkestone, Kent.

Fig. 3a-c. *Idiohamites ellipticoides*, body chamber fragment from the Upper Gault of Merstham, Surrey. BMNH C39942, figured by Spath 1939, pl. 65, fig. 9a-b.

Fig. 8a-b. *L. (Labeceras) plasticum* Spath, specimen from the lower part of the Upper Albian, Munyuwana Creek, north-east of Hluwluwe, Zululand, South Africa. BMNH C76858.

All specimens are figured natural size, and $\times 2$.



